

CLAIM AMENDMENTS

1. A method of providing embolic protection at a lesion in a treatment zone in a vessel, the lesion location defining the location of the treatment zone, said method comprising:

inserting and positioning an occlusion device (60) in said vessel at a location distal of the lesion without placing an occlusion device proximal of the lesion in the same vessel;

treating a lesion in said vessel at a treatment zone (40) near said occlusion device with a treatment device (260); followed by, (see Fig. 9)

positioning an extraction section (12) at a location near said lesion, said extraction section of the type having a fluid ejection port where injected primary fluid mixes with ambient fluid and debris creating a wall attached entrained flow;

supplying a fluid to said extraction section forming a primary flow (32) to engage and entrain (34) debris at the site of said lesion generating an entrained flow, said entrained flow containing both primary flow and debris from the lesion;

providing a sheath (20) having an extraction lumen proximal of said extraction section to receive said entrained flow. (see Fig. 10)

2. The method of claim 1 wherein:

said sheath extraction lumen is advanced (28) alternately toward said extraction section and away from said extraction section to further extract debris while said extraction section (12) is approximately stationary in said vessel. (see fig. 10)

3. The method of claim 1 wherein:

said extraction section 12 is alternately advanced toward said occlusion device and away from said occlusion device (30) while said extraction sheath (20) lumen remains relatively stationary in said vessel to further extract debris. (see Fig. 10)

4. The method of claim 5 wherein:

said supplying step occurs while the occlusion device is deflated after the therapeutic intervention of the lesion. (see Fig. 16)

5. The method of claim 1 wherein:

said occlusion device is an inflatable balloon. (see Fig. 9/10)

6. The method of claim 1 wherein:

said occlusion device is an occlusion filter. (see Fig. 11/12)

7. The method of claim 5 wherein:
said supplying step occurs during the occlusion device deflation after the therapeutic intervention of the lesion. (see Fig. 16)
8. The method of claim 5 wherein:
said supplying step occurs prior to the occlusion device deflation after the therapeutic intervention of the lesion.
9. The method of claim 1 wherein:
said extraction section has a jet angle of approximately ninety degrees, and a wall angle of approximately forty degrees. (see fig. 6)
8. The method of claim 1 wherein:
said extraction section has a jet angle of approximately one hundred eighty degrees, and a wall angle of approximately zero degrees. (see fig. 7)
10. The method of claim 1 wherein:
said extraction section has a jet angle between approximately one hundred eighty degrees and ninety degrees, and a wall angle of between approximately zero degrees and forty-five degrees. (see fig. 7)

11. A method of embolic protection at a lesion in a treatment zone in a vessel comprising:

introducing a sheath having an occlusion balloon and an extraction lumen to a location proximal of said lesion;

inflating said occlusion balloon;

introducing an angioplasty catheter having an extraction section distal of said therapy balloon into a vessel said extraction section of the type having a fluid ejection port where injected primary fluid mixes with ambient fluid and debris creating a wall attached entrained flow;

inflating the therapy balloon to treat the lesion;

activating the extraction section by injecting primary fluid under pressure;

deflating the therapy balloon;

allowing or causing a retrograde flow to remove debris from treatment zone through said extraction lumen.

12. A method of embolic protection at a lesion in a treatment zone in a vessel comprising:

introducing a sheath having an occlusion balloon and an extraction lumen to a location proximal of said lesion;

inflating said occlusion balloon;

introducing an angioplasty catheter having an extraction section said extraction section of the type having a fluid ejection port where injected primary fluid mixes with ambient fluid and debris creating a wall attachment entrained flow, distal of said therapy balloon into a vessel;

activating the extraction section by injecting primary fluid under pressure;

inflating the therapy balloon to treat the lesion;

deflating the therapy balloon;

allowing or causing a retrograde flow to remove debris from treatment zone through said extraction lumen.

13. A method of providing embolic protection at a lesion in a treatment zone in a vessel, the lesion location defining the location of the treatment zone, said method comprising:

inserting and positioning an occlusion device in said vessel at a location distal of the lesion or proximal of the lesion but not both proximal and distal of the lesion in the same vessel;

positioning an extraction section of the type having a fluid ejection port where injected primary fluid mixes with ambient fluid and debris

creating a wall attachment entrained flow, at a location near said lesion distal of a therapy section on a single catheter, followed by;

treating a lesion in said vessel at a treatment zone near said occlusion device with said treatment section;

supplying a fluid to said extraction section forming a primary flow to engage and entrain debris at the site of said lesion generating a wall attachment entrained flow, said entrained flow containing both primary flow and debris from the lesion;

providing a sheath having an extraction lumen proximal of said extraction section to receive said entrained flow. (see Fig. 17-19)

14. The method of claim 13 wherein:

said therapy section is an angioplasty balloon and the supplying step occurs while the angioplasty balloon is deflated. (see Fig. 19)

15. The method of claim 13 wherein:

said therapy section is an angioplasty balloon and the supplying step occurs prior to and during the deflation of the angioplasty balloon. (see Fig. 19)

16. The method of claim 13 wherein:

said occlusion device is a balloon (24) located on the distal end of said sheath (20). (see Fig. 19)